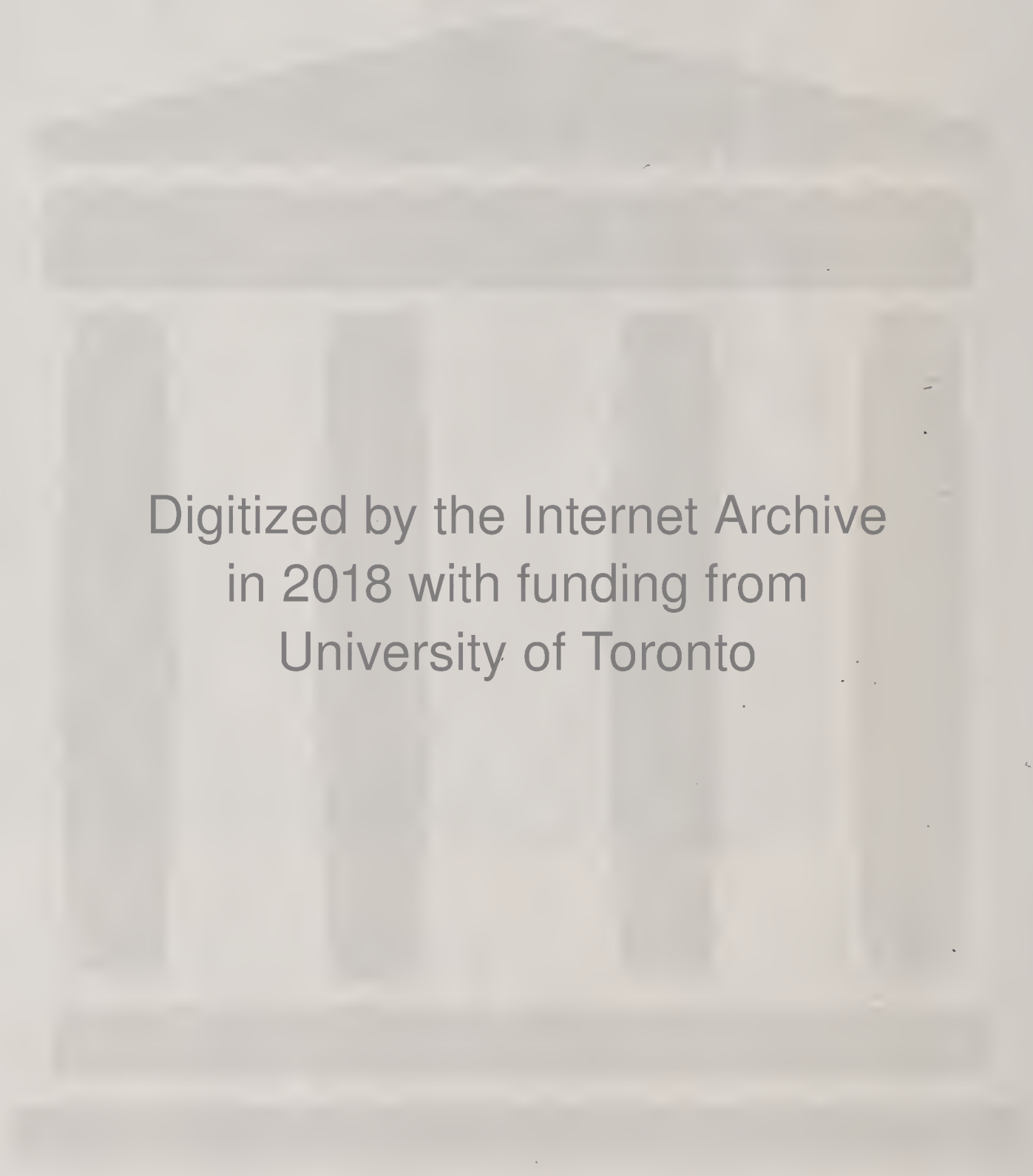




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Volume VIII

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EDITORIAL

The end of the year finds the student again burning the midnight oil and working hard on his "hunches." It finds the Journal more firmly entrenched than ever in the life of this medical school. We are glad to be able to report that the circulation of the journal has reached a new high level. We hope that the junior years have found more material of interest to them in this volume. While the publication of such material means less of immediate interest to the seniors, we trust that they will bear with us in the effort to make the Journal more of universal interest.

We wish to thank those who have contributed to this volume, both staff members and students, and in particular Mr. Adrian Anglin, for his very able management of the "Book Reviews" department. One who has never written

an article scarcely begins to realize the amount of labor and time entailed in writing a full, accurate, up-to-date paper. The experience acquired in doing so is very valuable, and we hope that our successors will have offered them even more student articles than we had.

It has been felt that an emphasis of some suggestions made in a previous number would not be out of place. The readers are referred to the December, 1930, number. These suggestions may be supplemented by a few words on the care that should be taken in the preparation of scientific articles. Before presenting articles, it is of great value, both to the editors and to the author, for the author to revise his manuscript many times with a view to proper continuity of thought in chapters, paragraphs, sentences, clauses and phrases, and in words. No one, less likely a

medical student, writes perfectly; actual construction is fairly simple; but poignancy or propriety or acuity in choice of words is difficult.

Most medical articles are dry stuff. Try to make your words crisp, merry and pointed. Beget short and forget long words!

Details Connected With the Evolution of Medical Education in Toronto.

By NORMAN B. GWYN. M.B., TORONTO.

In response to a request of your editor that I write for him a short description of the medical schools of Toronto, I suggested that if he would permit me to put this description in some form of an anecdotal detail it would make a simpler performance and perhaps would serve to bring before us the fact that the study of medicine in Toronto was closely bound up with the struggle for civil and religious recognition which was waged so bitterly in the middle years of the last century. With his consent I put before the readers of the Journal a few details of interest to all students of medicine, some of the foundation facts upon which now stands that splendid superstructure which we call the medical faculty of the University of Toronto, and that one may see those foundations at a glance I have sketched the following plan which may serve in place of a chronological description of the schools of medicine as they came into existence, waned, were abolished, or established themselves firmly by some sensible plan of union.

Diagrammatically it is at once apparent that the hand of John Rolph must have overlain the development of all early medical policy and education. From 1824 to the time of his laying down the reins as dean of the Victoria medical faculty in 1870, we find him a power always to be reckoned with. "Where John Rolph was there was medicine taught," was the saying of the time. With his position as a member of the government, with his political and oratorical gifts, he wield-

ed an influence widespread and subtle. Were one able to say that this influence had always been for the good,—that unity, peace and concord had been his constant ideal, there would be but little to say of medical education in Toronto that differed from medical education in its evolution elsewhere. A peculiar set of circumstances, however, had created for Rolph an army of hostile camps. Subjected to a ceaseless fire of annoyances, his better nature seemed to desert him, and he became like the old "Shimei" referred to in Osler's writings as one who might "create a spirit of contention which it would take three generations to efface."*

About this stormy petrel whose flutterings were so familiar upon the political horizon, centered most of the dissensions which disturbed the medical world of Toronto for so many years. A distinctly remarkable man and evidently a wonderful teacher of medicine, he yet had that about him which prompted distrust and caused men in the end to withdraw from association with him. Even in the organizations of his own creation, this seemed to be the state of affairs, for both at the beginning and the end of his school's existence we see organized rebellion on the part of his associates, who do not hesitate to accuse him of promoting undercurrents of thought and action

*The reference to "Shimei" will, of course, be recognized by the medical students as, Second Samuel, 16th chapter, 5th verse. He was the "honor malignant" of his time.

Diagram.

The Rolph Regime. 1824.	Toronto School of Medicine. 1856.	King's College and University of Toronto, Medical Faculty. 1844.	Upper Canada School of Medicine. Trinity College Faculty. 1850.
1824: John Rolph teaching in St. Thomas and Toronto up to 1837.			
1837: The Rebellion. Rolph in exile, but has several medical students from Toronto.			
1843: Rolph returns to Toronto. Teaching of Medicine resumed.			
1844: The Rolph School is formed and is the first so-called "Toronto School of Medicine." It affiliates with Victoria and becomes the medical faculty of this University.		1844: King's College Medical Faculty organized. Flourishes, but is abolished by the Hinck's Bill of 1852-1853.	
1856: The majority of the faculty desert Rolph, who promptly reforms the school and continues his teaching in association with Victoria. Investigation of affairs at Toronto General Hospital instigated by Rolph's students.	1856: The secession of Rolph's associates which took with it the title, "Toronto School of Medicine," allowed by the courts. This group formed the school which, an independent organization at first, was taken over by the University of Toronto in 1887. From 1856 to 1875, this institution was at continual warfare with Rolph and his associates.		1850: The Upper Canada Medical School, organized by Bovell and others. Became Trinity Medical Faculty. This school flourished, but owing to conflict of the faculty with Bishop Strachan, dissolved in 1856.
1868-9: Toronto General Hospital closes its doors. No clinical facilities at this time.	Toronto General Hospital closes its doors. No clinical facilities at this time. Osler and many of the best students in the "Toronto school" leave for other institutions.		
1870: Rolph resigns from medical teaching. Dies aged 83.			1870: Trinity re-organized.
1874-5: The Rolph School ceases to func-	1874-5: The Toronto School takes over the property of the Rolph Victoria Medical Faculty on Gerrard Street East.		
1887:	Toronto School of Medicine taken over by the University of Toronto as its medical faculty.	1887: Medical faculty of University of Toronto organized with the absorption of the Toronto School of Medicine.	
1900:			
1905:			1903: Trinity Medical Faculty unites with the University of Toronto.
1930:		University of Toronto Medical Faculty, an evolution of the Toronto School of Medicine in conjunction with the faculty of Trinity. A progressive existence for the last twenty-five years.	

which might work more particularly to his peculiar advantage.

Leading up to the distinctly remarkable happenings in the realm of medical organization, happenings which from their political and religious associations have a special appeal to those interested in the study of medical history, a short resume of the career of John Rolph and of his relations to those about him, is perhaps first in order. The rebellion of 1837 left him a marked man. No one has ever explained how it happened, that he, an admitted rebel, should be found carrying a flag of truce out to McKenzie and his nondescript army who were marching on Toronto. In spite of the fact that he left the country with a price on his head and remained in banishment for six years, he appeared to many of his old associates as nothing short of a traitor, while the mere fact that he had been in rebellion made him at once an enemy of all the loyalist group. Nor from these quarters only, emanated the steady hostility towards Upper Canada's first great teacher of medicine. The strongest opposition to his plans seemed in the end to be clothed in the uniform of religious antipathy. The old cry, transported from the Motherland, of "church versus dissent," was raised against him. It is the opinion of many that this cry finally carried the day against him.

The bearing of religious strife upon Rolph's plans can be shortly touched upon and put aside, though it is quite apparent that it must not be forgotten. His brilliant speeches in the House of Parliament on the question of the Clergy Reserves and the disposal of the funds from the sale thereof, while perfectly proper and patriotic in their attitude, were always looked upon by the Anglican element as sins against the Lord's anointed. It was not in the least likely that when the Trinity group came to be in control of the General Hospital (1852-6) that his attitude towards Strachan and his clergy would be forgotten or excused. The remark-

able state of affairs which developed in this connection is referred to by Dr. C. K. Clarke in his history of the General Hospital. The full account of it is to be found in the library of Victoria. Thus, assailed on all sides by enemies, political and religious, Rolph became the central figure in several interesting incidents which we can now describe.

1. Rolph and His Relation to the Founding and Abolishing of the King's College Medical Faculty.

Looking at the chart, one sees that the King's College Medical Faculty would be Rolph's one and only rival, where the teaching of medicine was concerned, for the seven years, 1844-1850.* As minister in the Hinck's government, he would be quite conversant with everything that preceded the founding of this excellent medical faculty. As part of King's College,—with provision made for the salaries of the teachers in the clinical branches—with equipment for primary studies such as Rolph's Private School could not hope to have, King's College made rapid strides, and was soon well established in public favour. Without question it would be the easiest thing to say that Rolph engineered matters for the abolishing of the medical faculty of King's College in order that his school might have unopposed control of medical education in the upper province. The common gossip of the time was that Rolph was guilty of so-doing, and the interesting account of some of our old teachers which is to be found in the library of the university leaves one convinced that Rolph was guilty of every accusation made against him by the professors of the King's College Medical Faculty, who as a result of the medical school's disappearance would be left without a position.

There is another side to the story, however, and that is that the Uni-

*In 1850 of course the Upper Canada Trinity School came into existence.

versity of Toronto, which by 1852 had supplanted King's College, was following the example of the University of London and was merely separating the teaching faculties from the facilities which might exist for the granting of degrees. Law, medicine and theology were no longer to be taught at the university though the authorities provided for granting degrees in these studies. No one should ever condemn Rolph out of hand until this side of the question has been thoroughly considered. One can see from the chart that from 1852 to 1887, the University of Toronto was content to carry on without a medical faculty, and that from 1870 to 1887, John Rolph was not alive to carry on a contest. His influence in politics, moreover, had practically ceased by 1855. No matter what the consideration, however, the net result of the abolition of the King's College Medical Faculty, where Rolph was concerned, was the binding together of a group of men who could only look upon him as their natural enemy.

2. Rolph and His Contact With the First Trinity Faculty of Medicine.

From 1850 to 1852, Rolph would have two schools in Toronto in active competition with his own. The rapid growth of the Upper Canada Medical School, Trinity as it quickly became, was an interesting feature of the years from 1850 to 1856. With a distinctly brilliant group of men in the teaching faculty, one of whom was James Bovell, Osler's great teacher, Trinity stepped rapidly to the front. King's College medical department disappeared by 1852, as a result of the Hincks bill and the loyal Anglicans of the province gave Bishop Strachan and his new venture strong support. It is not in the least unlikely that Rolph's association with the Methodist element would help drive many students into the Anglican school, as 'Church and Dissent' were in active conflict in these years. Hostility, however, between the Rolph

school and Trinity or any Anglican aggregation would be vigorously nursed by the conditions referred to above, i.e., Rolph's stand on the question of the Clergy Reserves.

With Rolph's return to political life after banishment, he seems to have thrown his energies into the challenging of Bishop Strachan and the whole Anglican body in their claims respecting these Clergy Reserves. This has already been touched upon. Any student of Canadian history knows that the feeling between Anglicans and the so-called dissenting religions ran high. No one in those days ran counter to the wishes of Bishop Strachan without precipitating a feud of a very active nature. Strachan and his associates made much of the Trinity Medical Faculty, which was organized in 1850. They were influential men and seemed in a short time to acquire control of affairs in the Toronto General Hospital. So complete was their control that the students of Rolph's school soon began to realize "that they were so much dirt in the wards and corridors of the building."* Their treatment was such that they complained in the columns of the daily press and a public investigation which lasted for one week was the result. A great deal of unpleasantness was revealed in this investigation, and it was quite apparent that the superintendent of the hospital had but little consideration for Rolph and his men. Quite apparent also was the fact that the malcontents of the disbanded King's College faculty had joined forces with his present enemies, and were stooping to the meanest forms of warfare. One fears that Rolph's association with Victoria and the Methodist element loomed large in the mind of the superintendent when the question of dealing with Rolph and Victoria students came up.

Trinity's active opposition to Rolph

*See report on investigation of affairs at Toronto General Hospital, 1856, at Victoria Library.

and his school came to an end about this time, when the medical faculty of Trinity, incensed with what they considered a domineering attitude exhibited towards them by Strachan and the council of Trinity, handed in their resignations and broke up a thriving medical organization. It is interesting and important to know that the cause of trouble here bore directly upon matters related to the disturbing Hinck's bill. The repeal of this bill had been discussed in the House. Panic seemed to have struck at the hearts of the Trinity medical men as they sensed the decline of their school with the re-opening of the "King's College-University of Toronto" medical department. Instructed by Strachan to consider the Government's communication on the subject and to report back to him they so far forgot their position as to open negotiations with the government on their account. Strachan demanded that the erring professors apologize to the Trinity council and to himself for their hasty action and with the apology the faculty of medicine tendered its resignation. The incident shews very clearly just what the state-aided medical faculty meant to the private institutions such as the Rolph and the Trinity schools.* The popular cry against state aid in the teaching of law, medicine and divinity probably induced the government of the day to leave matters where the Hincks bill had placed them.

From now on things should have been but plain sailing on the course planned for the continuation of the Rolph school of medicine, for with the disappearance of Trinity he was the undisputed master of the medical field. From his own loins, as it were, sprang the next enemy, an enemy destined to wear him down in the strife and to wipe from the field even the signs of his existence. This detail was perhaps the saddest part of his troubled career.

III. The Secession From Rolph of His Staff and the Establishment by Them of a School Which Took From Him the Title of "Toronto School of Medicine."

"The dean is steadily trying to wean the allegiance of the students; we have the legal right (to charter and title) and we intend to take our chance." This from the letter of one of Rolph's associates tells its own story. Six of an incorporated body of seven, "The Toronto School of Medicine" were evidently resenting the attempts of one of the body to gain control. Six of a staff of seven walk out in open rebellion on the opening day of the term, October, 1856. They are awarded charter and use of title by the courts of the day, and from now on "Toronto School of Medicine," is a new body which moves into Moss Hall (the old King's medical building which stood where the biological theatre and laboratories now look out on the Park), and which enters into an affiliation with the University for the purpose of obtaining degrees and for the added advantage of making use of university facilities in the primary studies. Notwithstanding the fact that the adherents of Rolph like to say that "where John Rolph was there was the Toronto school of medicine," the success of the secession showed that the "writing was on the wall." From the disbanded faculties of King's and Trinity came eager enemies whose descendants at least showed that living jackals could worry a dying lion.* For fourteen years the warriors collected from three faculties, each with a separate grudge, waged a continuous warfare against Rolph and the new school, which he had formed over night as it were, when deserted by his former colleagues. In the end, victory rested with the big battalions, but not before a fair country had been laid waste, for the

*This story is told at length in the minutes of the Trinity corporation.

*A scurrilous leaflet, "Hogg's Hollow Med. Fac., Stentoria University," will serve to prove this statement.

closing of the Toronto General Hospital and the driving away of Osler and other brilliant students, was a direct result of the conditions which developed during this internecine strife.

This closing of the General Hospital and the deprivation of clinical facilities which ensued might well be called the last act of the drama in which John Rolph had played so leading a part. What follows is mere epilogue. An enemy more sinister than warring colleagues was assuming command of hostilities and old age was the victor to whom the veteran teacher of nearly fifty years was to surrender in the end.

In 1870 came the demand that the veteran dean of the Victoria medical faculty resign or allow the appointment of a coadjutor dean. The demand was based upon the obvious fact that John Rolph, now in his eighties, was incapable of carrying on and must be supplanted. Fighting to the last, making demands when submission was expected,* he finally agrees to abdicate, and with this abdication came shortly the end of the Rolph Victoria medical

school in 1874-5. As if to wipe out all traces of the Rolph regime, the opposition school moves into the building (Gerrard St. East) which had housed their foe.

The day of senseless strife was over. Political and religious animosities were wearing themselves thin. A new Trinity medical faculty saw its opportunity in 1870, and contributed much to the stabilizing of medical conditions for thirty-three years, ending a splendid existence by uniting with the University in 1903. The re-organized general hospital played its part and clinical teaching became a real factor in the life of the Toronto schools. From 1887 to the present day the University of Toronto medical faculty, a sound development from the absorption of the Toronto school and Trinity, has surged steadily forward and ranks now as one of the greatest medical schools of the world. The results of peace are everywhere apparent.

This concludes an attempt to describe in narrative the history of the conditions which lay behind the teaching of medicine as we see it well established to-day. The blighting influence of politics, of religious antipathies and personal enmities upon a most necessary branch of public education has never been more clearly demonstrated and certainly in few quarters of the globe have medical quarrels had more dramatic staging.

*Rolph's answer to the committee appointed to arrange these matters was: "I refuse to have a coadjutor; I refuse to resign; I want the resignation of Professor _____, as he is unfit for his position; I want John Widmer Rolph appointed as demonstrator in medicine." Later in the same day he realizes that his time has come and submits his resignation.

Renal Pain: Diagnosis and Treatment.*

By ROBIN PEARSE, M.B., F.R.C.S.

Renal pain falls clinically into two types. First—the acute colic due to distension of the pelvis and calyces, following obstruction to the flow of urine down the ureter. The pain can be produced by injecting fluid into the pelvis through a ureteral catheter. Second—

a more or less severe ache caused by congestion or inflammatory changes.

The diagnosis of acute renal colic presents as a rule but little difficulty. The sudden onset, the location of the pain in the loin which the patient demonstrates by placing the thumb in the costomuscular angle and the fingers along the course of the ureter, the radiation of the pain to the genitals or

* Reprinted by permission of the Bulletin Committee of the Academy of Medicine.

thigh, and perhaps the presence of ocular blood in the urine and the history of previous attacks, makes the diagnosis in a typical case very simple.

However, the association through the coeliac plexus of the renal and intestinal nerve supply will sometimes lead to reflex symptoms which are apt to be very misleading. A patient with a stone impacted at the uretero-pelvic junction or in the upper portion of the ureter may develop a broad-like, distended abdomen, tender on palpitation, with profuse copious vomiting, no passage of flatus and no result from enemata; in fact, all the symptoms and many of the signs of an early acute intestinal obstruction. But the picture is not true, for in the patient with a renal condition the pain is constant, not rhythmic, as is the case in intestinal obstruction, abdominal palpation will not evoke visible peristalsis, and there is no release tenderness, but there is tenderness in the costomuscular angle.

The abdominal condition is, in fact, not an intestinal obstruction but a paralytic ileus, which will be cured by removing the cause or inhibiting the reflex nerve impulse.

On diagnosing renal colic one has two duties to perform. (1) Relieve the pain. (2) Complete the diagnosis. The first must be done at once; the second can only be done at leisure.

For the pain, $1/75$ atropine, $1/4$ morphine and $1/200$ hyoscine followed if necessary in fifteen minutes by $1/150$ atropine and $1/4$ or $1/6$ morphine will usually suffice (but some cases require light anaesthesia), and a hot-water bottle to the area of pain will carry the patient over till morning. A sample of urine voided immediately after the colic should be saved for examination. It will probably show some albumin, red blood cells and crystals. If it shows none of these things, the case is either not renal colic or the ureter is completely blocked.

The first step in completing the diagnosis is to have the patient x-rayed for suspected stone. He must take an ounce

of castor oil on the day preceding the examination to eliminate gas and faecal shadows, and the whole length of the urinary tract on both sides must be taken, as one may find a stone in one kidney giving symptoms and a silent stone in the other; or there may be a stone in the kidney and one in the ureter, or, finally, the pain may be on one side and the stone on the other, a reno-renal reflex.

Shadows which may cause confusion are thrown by calcareous glands, foreign bodies in the bowel, gall stones and phleboliths. Calcareous glands throw a shadow with a moth-eaten appearance and stereo anterior to the ureteral level. Gall stones when large throw a ring-shaped shadow owing to the centre being transparent to the rays, while the shadows of phleboliths are small, dense and clear-cut and frequently need a stereoscopic picture with an opaque catheter in the ureter, or pyeloureterogram to clinch the diagnosis. At times it may be inadvisable to cystoscope a patient, or one may be unable to catheterize the ureter. In this case uroselectan may be given to localize the ureter, but this does not always succeed, as the kidney may have temporarily ceased to function.

As regards treatment, a solitary stone of moderate size in the pelvis of the kidney does not call for cystoscopy before operation. It is removed by pyelotomy. The same is true of small stones in calyces. Larger stones require nephrotomy. Where the stone is of such size that one would suspect the function of the kidney to be gravely impaired, especially if there be much pus in the urine, ureteral catheterization and bilateral function test should be done to determine whether the kidney is worth saving, but remember that the kidney will increase its function from 50 to 100 per cent. after the stone is removed.

When stones are present in the kidney and upper ureter they can be removed through the same lumbar incision, but if there is a stone in the kid-

ney and one in the lower ureter it will be advisable to endeavour to get the ureteral stone to pass, and avoid the necessity of two incisions.

When bilateral renal stones are present, a most complete pre-operative diagnosis must be made, including Non prot. nitrogen in the blood and the separate renal function.

One sometimes finds that the kidney with the large stone is the patient's hope of life, and that the kidney with the smaller stone is dead.

As a general rule it is wiser to operate on the better kidney first.

As regards ureteral stones. If the stone is obviously too large to pass, or if the kidney is septic, it should be removed at once by open operation. Where there is a probability of its coming through, if very small it may be left alone. Otherwise the patient should be given gas or spinal anaesthesia and the ureter dilated as fully as possible and a large Garceau catheter left in for twenty-four to thirty-six hours, irrigating through the catheter with 1/5000 silver nitrate every four hours to keep it clear. After removal of the catheter the stone usually follows in a day or so, but occasionally is delayed for several weeks.

Pyelonephritis is a contra-indication to manipulative methods for removal of ureteral calculi. An indwelling catheter is, however, useful in draining a pyonephrosis previous to operation, and may make possible a primary nephrectomy in a case which otherwise would have required nephrotomy and secondary nephrectomy.

We now come to cases of renal colic with negative x-ray examination. Clinical examination has ruled out the extra renal pitfalls and revealed on abdominal examination a kidney which is abnormally movable.

When I was an undergraduate student we were taught that to tell a woman that she had a movable kidney was the unforgivable sin, as the knowledge would make her a neurasthenic for the rest of her life. This teaching

was the reaction from the aftermath of bad results of indiscriminate nephropexy due to incomplete diagnosis.

A kidney may be unduly movable per se, or its abnormal mobility may be part of a generalized gastro-enteroptosis. To fix a kidney in the presence of a general gastro-enteroptosis and expect relief from the indefinite, but persistent symptoms, from which these patients suffer, is unreasonable. Moreover, everyone knows that many people have exceedingly movable kidneys and have no symptoms.

What, then, is the added factor? It is obstruction, and this occurs when the kidney gets into certain positions. Pyelography, especially if pictures are taken with the patient in a sitting position, will show that as the kidney descends, a loop of the ureter near the ureteropelvic junction is held up so that a sharp kink occurs. This kink may be caused by adhesions, a fascial or peritoneal band, or an aberrant artery. The obstruction causes distension and increased intra-renal pressure, resulting in pain, and succeeding attacks produce a gradually increasing hydronephrosis. The dilatation and consequent destruction of the kidney is at first slow, but after the pelvis enlarges sufficiently to overhang the aberrant vessel or band and produce a valve action when the pelvis is filled, the destruction is much more rapid. The slow initial progress accounts for many cases only coming to the surgeon in middle life.

As for treatment in early cases and thin patients, a belt, aided by diet and exercises aimed at correcting constipation, should be tried for three to six months, and then, if no better, nephropexy is indicated.

In more advanced cases, where definite hydronephrosis and diminished renal function is present, palliative treatment is useless. Nephropexy, with careful freeing of the ureter from all adhesions, division of bands or obstructing vessels, and at times plastic operations on the ureter or kidney pel-

vis will be required, and in cases where the kidney is practically or entirely functionless, nephrectomy.

Ureteral stricture is another cause of renal pain with negative x-ray plates. Strictures may be congenital, inflammatory or traumatic. Diagnosis is by ureteral bougie or catheter and pyelogram, and treatment intermittent dilatation or more forcible dilatation under anaesthesia. Unlike urethral strictures which require dilatation at regular intervals, ureteral strictures once dilated to full calibre are cured, probably because the fibrosis in the latter is intramural and in the former extramural, i.e., peri-urethral.

When the stricture is at or near the ureteropelvic junction it is difficult to dilate by passing bougies up the distal twelve inches of ureter, and may require pyelotomy and retrograde dilatation.

We now come to a series of patients who have persistent pain, with intermittent exacerbations in one kidney. The urine may be normal, x-ray is negative to stone, catheterization of the ureter reveals no stricture, and pyelogram shows a very thin shadow as if the calibre of the ureter was very small or the picture had caught it in extreme systole. The latter is the true interpretation.

Turning to the anatomy of the kidney, one finds a series of sphincter muscles guarding the exit to the minor calyces, the major calyces and the ureteropelvic junction. These muscles are

kept in tonic contraction by the sympathetic nervous system.

If in a normal person a ureteral catheter is passed to the kidney pelvis and opaque fluid injected while the kidney is observed with a fleuroscopic screen, the pelvis and calyces can be observed to fill, and if then the catheter be withdrawn, waves of contraction starting in the upper calyx and passing to each calyx, and then the pelvis and ureter are observed. This peristalsis forces the urine into the bladder in the effluxes which we are accustomed to observe through the cystoscope.

This method of examination, conveniently but somewhat incorrectly termed "pyeloscopy," has not as yet arrived at a sufficient stage of technical perfection for standard use. However, examination of a patient suffering from "nephralgia without apparent cause," by this method will show that the normal peristaltic wave is blocked by spastic contraction of one or more of these ring muscles producing a damming back of the urine, distension of the calyx or pelvis, and pain.

Several years before pyeloscopy was possible, Mons, Papin and others had concluded on theoretical grounds that the pathology just described occurred, and, following up their theories, divided the renal sympathetic nerves, thereby diminishing the constrictor tone and achieving complete relief of pain and thus transferring another group of invalids from that convenient diagnosis, neurasthenia.

Pain in the Chest.

By J. A. OILLE, M.D.

To establish the cause of thoracic pain is often an extremely difficult as well as a very important problem. It is well to be as certain as possible of the diagnosis, else a dangerous angina might be considered mild because the distress was slight; or a pain in the cardiac area due to an unimportant

cause might be diagnosed angina; which mistake would more or less destroy the comfort of the patient, or even wreck his life.

It is of great help in the investigation of thoracic pain to consider the anatomical possibilities. A tabulated list of the causes should therefore be before one's mind.

A. CAUSES IN THE CHEST WALL.

1. Pains very frequently occur which are due to an arthritis of the vertebral articulations or to a root neuritis, secondary to this arthritis.

2.- Pains may be due to a local neuritis from pressure, inflammation or degeneration, such as herpes zoster. The rash of the latter, however, usually makes the diagnosis certain in a few days, but the appearance of the rash may be delayed as long as five weeks.

3. Pains may result from an involvement of the vertebral bodies by inflammation, tuberculosis or new growth. These cause severe, persistent pains, usually worse at night, and of constant location, and may require a radiograph to establish a certain diagnosis.

4. Another cause is local disease in the chest wall, such as inflammation, tuberculosis or mastitis. These all give local signs, such as swelling, tenderness or changes in colour.

5. Pressure on the chest wall by internal enlargements or growths will be revealed by physical or X-ray examination.

6. Rare cases occur in which a fractured rib follows a severe attack of coughing, or even an asthmatic attack. Intercostal neuralgia, myalgia and pleurodynia are indefinite terms that should be discarded, because they signify nothing more than pain of unknown origin.

B. CAUSES IN THE VISCERA.

1. Cardio-vascular pain, including pericarditis, dilated aorta and aneurysm, is the most important of this group.

2. The pain of pneumonia, pneumothorax and pulmonary embolism is of short duration, and the cause is usually evident from physical examination or the circumstance of occurrence. Pleural pain is unilateral. It is related to respiration, and the diagnosis is established by history, physical and X-ray examination. Some cases of tuberculo-

sis necessitate repeated sputum examinations. The commonest first symptom of lung tumour is pain due to pleural involvement. This diagnosis might be suspected from the history, but usually can only be substantiated by X-ray investigation. A pain due to pleurisy may be referred to the under surface of the arm above the elbow, which is the second thoracic segmental area. It does not extend, however, down the arm as does cardiac or arthritic pain. Pleural pains are frequently referred to the side of the abdomen, and may go as low as Poupart's Ligament (the twelfth thoracic segment).

3. Mediastinal tumours do not produce much pain except by pressure on the chest wall or by some secondary effect, such as pleural, pericardial or vascular involvement.

4. Oesophageal obstruction produces distress related to swallowing and can easily be diagnosed by passing a bougie or watching the patient swallow barium and buttermilk on the fluoroscopic screen.

5. Gall stones and gastric disturbances, such as "heart-burn," occasionally have their pain referred to the chest. The distress of gastric disease is related to eating, usually begins in the epigastrium and may follow up the mid-line of the chest and be followed by regurgitation of a mouthful of sour fluid. Gall stone pain is usually situated in the upper third of the abdomen, and may involve the lower part of the chest. The previous history usually distinguishes this pain from that of coronary thrombosis which it most nearly resembles. The history would reveal the presence of repeated attacks of gall stone colic over a period of years, or of gall bladder disease evidenced by indigestion with fulness and belching of gas or occasional attacks of epigastric pain, vomiting, fever and tenderness over the gall bladder. A stone in the common duct causes periodic attacks of chills, fever, pain and jaundice. In some cases the diagnosis

is made easy, because pressure on the gall bladder area produces a pain referred to the left breast. It should be remembered that the typical direction of radiation of gall bladder pain is to the right shoulder behind, and that it is only in rare cases that pain is referred to the left breast.

6. In very rare cases, disease of the spinal cord or meninges might produce pain in the chest. It would, however, probably start in the back and radiate around to the front, and sooner or later would produce changes and physical signs referable to the nervous system.

Cardio-vascular pains are by far the most important, and of these there are many varieties; first of all it must be recognized that in any cardiac disease pain might occur. This is no doubt of the same nature as any other visceral pain. Even in bacterial endocarditis, there is pain in the left side of the chest occasionally. It is usually dull and persistent; that is, it lasts for hours or days at a time and comes and goes without evident cause. In rheumatic heart disease, a similar pain occurs. In rheumatic arthritis, precordial pain suggests active cardiac involvement. This pain may be mild or severe, but usually is dull and continuous. Some few cases of mitral stenosis have pain in the left side of the chest or shoulder continuously for years—or it may be intermittent, lasting for hours or days at a time. This pain may be made worse by exertion or it may occur quite independently of exertion. Occasionally such pain is improved by exertion.

The pain of pericarditis might be either direct or referred. The parietal pericardium has a sensory nerve supply. This pain is usually not sharp; it is, however, continuous, and is intensified by breathing or moving. Frequently, however, these cases have no pain at all.

Cases of aortitis produce pain of two different varieties. Some of them get irregular pains at night lasting from

a few minutes to a few hours, which are thus quite independent of exertion. Many of them, however, have an anginal type of pain; that is, a pain which comes with exertion, lasts a few minutes and disappears with rest. When aneurysm occurs, pain may be produced by the partial rupture of the wall of the aorta. This is persistent and severe, and frequently worse at night. Aneurysm may also produce a pain by pressing on surrounding structures, such as the bodies of the vertebrae or the chest wall.

Cases of aortic stenosis and aortic insufficiency frequently have pain that is of the same two types as described for aortitis.

In different parts of the world, the word "angina" is used with two different meanings. Some use it to include all types of cardiac pain. It is so used in the classification of Heart Disease by the American Heart Association. It is most frequently used, however, in connection with a special type of pain, one that is usually due to coronary sclerosis. This latter use of the word carries a diagnostic inference. When an individual old enough to have vascular disease can walk only a restricted distance, and has to stop on account of distress in his cardiac area, he is said to have "angina pectoris."

In angina pectoris the distress may occur anywhere from the third cervical to the eighth dorsal spinal segments. It must not be forgotten that the eighth dorsal segment posteriorly is several inches higher than it is anteriorly, so that a pain that goes to the back to an area as low down as the eighth dorsal segment is anteriorly would be quite too low for a cardiac pain.

The character of the pain has no diagnosis or prognostic value. It may be of any severity from a slight discomfort or fullness or sense of oppression or constriction in the chest to a severe pain. In angina there is no general relationship between the severity of the pain and the seriousness of

the disease. This observation does not hold for the pain of coronary thrombosis.

It is well known that anginal pains commonly radiate to the left shoulder and down the left arm. They may go to the neck or through to the back or to the right shoulder or arm or to both shoulders and arms. Again, the pain may start in the arms and radiate to the chest; or on rare occasions, it might start in the back and radiate around to the front of the chest. The radiation has no prognostic significance. This means that an anginal pain which radiates to the arm is no more serious than one which does not radiate at all. The radiation to the arm, on the other hand, has a diagnostic value. It serves to distinguish angina from pains due to abdominal disease; for instance, a gall stone pain might radiate to the left side of the chest, but it would be extremely rare for a gall stone pain to radiate down the left arm.

The pain of angina is usually of short duration, lasting for five or ten minutes. Occasionally it lasts half an hour and rarely an hour.

The exciting cause is the all important point. In many patients, careful inquiry is necessary to elicit this information. Some patients will tell you they get the distress after every meal and only after every meal. Then, on further inquiry, one may find out that it is only walking after meals that produces the distress. The diagnosis of angina is easy and certain when an individual old enough to have sclerotic vessels gets distress of any kind in the cardiac area more or less constantly when a certain degree of exertion is undertaken. In some individuals excitement brings on the pain more readily than does exertion. In cases where the pain comes from slight exertion it may also come from other slight causes, such as a conversation or in bed from a dream or from no demonstrable cause. For cases that have irregular pains not definitely related to exertion one needs, for diagnosis, the confirmation of fur-

ther investigation (physical, X-ray and electrocardiographic examination). However, these ambiguous cases are comparatively uncommon.

In coronary thrombosis the character of the attack is entirely different from that of angina. The pain is usually much more severe, is brought on by exertion in only a small percent. of cases and may be in a different locality. The most important distinguishing feature is, however, that the pain is persistent. It lasts hours instead of minutes. It may last as long as two or three weeks at intervals. It is accompanied by a leukocytosis and followed, after thirty-six hours, by a slight fever. It is likely to be accompanied or followed by some mild or serious change in the heart or circulation, such as the appearance of a weak rapid pulse or disappearance of the pulse with collapse, cold extremities, perspiration, etc., possibly temporary unconsciousness, delirium or sudden death. Other changes might be extreme anxiety, pallor, dyspnoea, faintness, palpitation, a fall in blood pressure or pulse pressure, a rapid enlargement of the heart, a new murmur, gallop rhythm, a rapid onset of oedema of the lungs or legs, enlargement of the liver, the onset of auricular fibrillation, paroxysmal tachycardia, pulsus alternans or any variety of block, or a pericardial friction. Thrombosis may occur on the infarcted area within the ventricle and result in embolism. The T wave in the electrocardiogram may take on a so-called "coronary" shape and the T waves change in shape and direction rapidly from day to day, tending to go negative in the first lead and positive in the third lead, with low or high take-offs from the end of the R wave. Vomiting occurs in severe cases.

Pains in the chest are very common due to involvement of the roots of the spinal nerves from arthritis of the vertebral articulations. Such pains may occur in any part of the body below the head. These pains, curiously enough, are frequently unilateral. They

may be short, shooting pains of only a few seconds' duration, or they may be dull and continuous and last for hours, days, weeks or months at a time. They have no special character; they may be sharp or dull or merely a discomfort of any sort. They may or may not be accompanied by hyperaesthesia. Any pain anywhere from almost any cause may be accompanied by hyperaesthesia, which, however, does not increase its seriousness. Spondylitic pains are usually worse in bed and are relieved by moving about. Naturally they are related to spinal movements or position and are sometimes relieved by change in position. The pain might be induced by lying on one side in bed or by turning over, or raising on one elbow, or sitting in a slouched position in a chair, or riding in an automobile. Spondylitis is diagnosed by limitation of or pain on movement of the spine. On examination, the spine should be twisted, bent forward, back and laterally. The movements of the neck should also be tested. Bony change is present in X-ray plates in osteoarthritis and in advanced cases of infectious arthritis. X-ray examinations are wise to confirm the diagnosis of spondylitis, and one should be careful not to diagnose spondylitis in every case showing painful or limited spinal movements, because similar symptoms are also produced by tuberculous or malignant disease of the bodies of the vertebrae. Obviously, in tuberculosis or malignancy, such pains would not exist for several years, as they would in spondylitis, intermittently.

The following are a few questions that should be put to a patient who consults a doctor on account of pain in the chest.

1. Inquiry into past history to determine presence of "indigestion," gall stone attacks, arthritis, tuberculosis, decreasing exercise tolerance, increasing dyspnoea, distress in the chest or palpitation on exertion.

2. Determination of exact location

and radiation of the pain, especially with reference to the lowest area of occurrence; e.g., a pain occurring on the left side of the body from the clavicle to Poupart's ligament could not possibly be cardiac in origin.

3. Discovery of other places in the body where pains occur. Frequently people who have arthritic and spondylitic pains all over the body will attribute to heart disease one of these pains because it happens to occur in the left breast. The very fact that arthritic pains do occur in different parts of the body is a point in favour of the pain in the left breast being arthritic and not cardiac in origin.

4. Inquiry into the duration of the pain. Duration includes length of attacks of pain, and length of time since attacks began. A pain that lasts only a second or two or a few seconds, is too short to be cardiac in origin. A pain in the chest lasting for a few hours is not angina. It could, however, occur in rheumatic or other heart disease, and it could be coronary thrombosis. If it had been recurring for a month or more, obviously it could not be coronary thrombosis. If, on inquiry, the exercise tolerance were found to be normal, and on examination the heart were found to be normal, this recurring pain could not be cardiac in origin. If the pain constantly comes with exercise and goes with rest and is of short duration, it is angina whether or not anything can be found wrong with the heart on examination, and whether or not the patient has spondylitis. Chest pains lasting for hours at a time over a period of more than six months, not related to exertion, with a normal heart, are almost always arthritic in origin. When a patient over forty years old first gets a chest pain lasting for half an hour to an hour or more, he should be put to bed for a few days and investigated for coronary thrombosis.

5. Inquiry as to occurrence of pain in bed or up. If chest pains occur

more often in bed than when up and about they are probably not cardiac in origin.

6. Inquiry into exciting cause of pain. Factors causing the pain must be accurately determined, as walking, bending, eating, breathing, movement, position, etc. In an anginal case, a hypodermic of adrenalin will usually induce an attack, which can be relieved by inhaling amyl nitrate or holding a tablet of nitroglycerine under the tongue.

7. Inquiry into associated symptoms. Dyspnoea does not usually accompany angina. An anginal attack usually is ended by a feeling of relief after belching of gas. Weakness, fatigue, perspiration, salivation, diuresis

and fear are indications of severity in an attack. These therefore would more likely occur in coronary thrombosis than in angina. All of the older and many of the more recent works use the term "angina" to cover also coronary thrombosis, so that many of the points attributed to angina really belong only to coronary thrombosis. Thus, the fear of impending death, the obvious danger, the very severe pains, are characteristic of coronary thrombosis rather than of angina. In this way, the dangerous reputation of angina is really borrowed from coronary thrombosis. In angina itself, there is very little danger. Most cases of angina ultimately die of coronary thrombosis or of gradual myocardial failure.

A Summary of the Liver Function Tests.

By R. J. GIBBONS, B.A., 3T1.

The multiplicity of functions carried out by the liver has resulted in the introduction of numerous tests of function, a few of which have proven reliable, while many have been discarded. There are two points which complicate this field of research; first, the fact that, as was shown by animal experiments 70% of the liver could be removed before fatal hepatic insufficiency occurs, indicating the large margin of physiological safety with which the organ is endowed and therefore much damage can occur before function begins to fail. Secondly, the multiplicity of function makes it difficult to obtain a single test which alone can be accepted as an accurate index of functional activity of the organ.

There are at present three main groups of tests: (1) dye tests; (2) carbohydrate tests; (3) tests dependent on pigment metabolism. At Toronto the pigment tests alone are used, but elsewhere one finds various references to these other tests, and a few words concerning them may be of interest.

The dyes most commonly used are phenoltetrachlorophthalein, which is now being replaced by bromsulphalein, while tetraiodophenolphthalein may be used for functional test and cystography at the same time. The tests are all the same in principle; the estimation, by colorimetric comparison with a standard, of the amount of dye remaining in the blood at definite periods following intravenous injection of the dye. These dyes are removed from the blood stream by the liver, and the amount remaining when compared with normal values is therefore an index of this excretory function of the organ. Investigations have shown that these tests are reliable indications of the liver damage, but no more sensitive than the older Van den Bergh test, except for a slightly earlier indication of secondary malignant metastasis given by the phenoltetrachlorophthalein. On the other hand they are time-consuming, require multiple venipunctures and more important than this are not without danger as they may in

some instances produce a flare-up of a subsiding hepatitis.

The carbohydrate tests are dependent upon the glycosuric function of the liver. The commonest of these being the laevulose test. An initial fasting blood sugar estimation is made, then 45 gms. of laevulose given by mouth and four blood sugar estimations are made at half-hourly intervals, thereafter. The criterion of hepatic inadequacy is taken as (a) a blood sugar rise over .135% with an absolute rise of 30 mg. above the initial fasting level for 1½ to 2 hours after administration. The test has found favor with European workers, but the majority on this continent agree with Snell, "the test may be of value in experimental studies; clinically, however, the results are too inconstant and the possibility of pancreatic effects too great for the test to be of value."

By virtue of its pyrrol derivation bilirubin reacts with Erlich's diazo reagent (diazo benzene sulphanilic acid) to produce a colored reaction compound azobilirubin. There are three types of reaction: (1) Direct, in which the addition of the reagent gives rise to a purplish red colour in usually less than one minute; (2) Indirect, in which this prompt reaction does not occur, but the colour develops readily on the addition of 95% alcohol and saturated ammon-sulphate solution; (3) Biphasic in which a faint red colour appears immediately and then gradually deepens with time or upon the addition of alcohol and ammon. sulphate as in the indirect reaction.

Pigment tests. (a) Qualitative Van den Bergh: The principles underlying this test, the technique and the three types of reaction, direct, indirect and biphasic, which occur are too well known to require discussion, but a note on their interpretation may be useful. The direct and indirect reactions are of use in diagnosis between obstructive and haemolytic jaundice. The test is, however, of little or no value in the diagnosis between toxic and obstructive

jaundice, for in the former at the onset a biphasic reaction occurs in nearly all cases, but later it becomes direct, while in the latter the reaction at first direct, becomes biphasic when the obstructive jaundice is of long duration.

(b) Quantitative Van den Bergh: the technique is that of the indirect test and the dye produced is colorimetrically compared against a standard ethereal solution of ferric sulphocyanate corresponding in colour to one V.D.B. unit or 0.5 mg. per 100 c.c. Above 4 units we enter the stage of clinical jaundice, but between this and the normal 0.2-0.5 units is a field of latent jaundice with a rise above the normal serum-bilirubin, but as yet no tinting of the skin or sclera. Here from the clinical point of view lies the greatest value of the quantitative test, for by it we can detect the early indications of damage to the biliary mechanism often before definite clinical signs appear and at a time when one would expect therapeutic measures to be more efficacious. e.g., each retention in the arsphenamine hepatitis which occasionally follows luetic treatments. The higher values obtained in frank jaundice are of course of use in following the progress of cases.

Tests For Bilirubinuria and Urobilinuria.

The exact threshold of the kidney for bilirubin is undoubtedly variable, but bilirubinuria occurs with, or just before the onset of jaundice depending upon the delicacy of the test used. Haemolytic jaundice, however, forms an exception to this statement, for although the serum-bilirubin may rise to 15 to 16 units, there is never bile in the urine. A further test of pigment metabolism is the test for urobilinuria: The production of urobilinogen by the action of intestinal bacteria upon the bile pigment is well known and need not be discussed here. In practice we may test the urine for urobilin by the Lugol's iodine-zinc acetate method

or for urobilinogen with Erlich's aldehyde reagent, upon the basis of which a quantitative test for urobilinogen has also been devised. In normal urine neither urobilin nor urobilinogen are present in sufficient quantity to give these reactions. The presence of urobilin in the urine indicates first, the fact that bile is reaching the intestine, and secondly that the urobilinogen produced is accumulating in the blood due either to abnormally great production as in haemolytic jaundice, in which case there will be no accompanying bile in the urine, or to the failure of excretion due to liver damage as in toxic hepatic jaundice in which case there will be no accompanying bilirubinaria. The presence of jaundice with bilirubin but no urobilin in the urine is indication of complete biliary obstruction. The urobilin test is more delicate than generally recognized, for urobilinuria occurs with far less degree of liver damage than does bilirubinemia. Piersol in a review of these tests states "In our hands an increase in the urobilingen is the most delicate test of impaired liver function. Urobilinogen is increased even when the damage to the liver parenchyma is slight; it is persistently increased so

long as any residual hepatitis remains and it is the one test which has been positive in a certain number of cases in which liver disease was suspected but could not be proven clinically."

Summary.

It has been pointed out that because of the liver's multiple functions, its large margin of physiological safety and remarkable ability to regenerate, the presence of a normal Van den Bergh and other functional tests does not exclude early hepatic disease. Positive tests on the other hand, when coupled with clinical findings, are of value in indicating the probable presence of definite and widespread liver involvement. Furthermore, it would appear that although certain of these tests are undoubtedly a reliable index of liver dysfunction we have, as yet, none definitely superior to the pigmentary tests combined with clinical observation; at the same time these alternative tests are more difficult to perform, in fact impossible outside of a well equipped institution, more trying upon the patient and, as in the case of the dye tests not without danger to certain types of patient.

Diagnostic Points in Gynaecology.*

By F. J. O'LEARY, M.B.

As symptoms referable to the pelvis loom large in female complaints, the physician is frequently confronted with gynaecological problems, and an exact diagnosis is demanded. This can usually be made by studying all the evidence available. Mistakes in diagnosis are due, as a rule, not to ignorance, but to failure to elicit important data bearing on the case.

This necessary information is supplied by:

- (1) A complete history of the patient.
- (2) A complete physical examination, including vaginal and bimanual examination.
- (3) Certain laboratory tests, e.g., leucocyte count, urinalysis, blood Wasserman Reaction, etc.

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- (4) Further diagnostic procedure—
Gas insufflation of the Fallo-
pian tubes—dilatation and
curettage—biopsy, etc.
- (5) Observation of the patient.

History:

A complete history of the patient implies a survey of all incidents of medical interest in her life — a detailed account of her present illness, and a knowledge of the workings of all her systems. This is important in gynaecology because:

1. Pelvic lesions are so often dependent on some previous event — a miscarriage, a delivery or an infection.
2. Systematic conditions frequently cause pelvic symptoms.
3. The two classical gynaecological symptoms, pain and bleeding, occur in such a variety of conditions that exact details of each are necessary to make a diagnosis.
4. If a surgical condition is present, we are concerned not only with the diagnosis, but with the patient as an operative risk.

Considerable skill, patience, and a knowledge of psychology are often necessary to determine the most important symptoms, as the patient often fails to recognize them, or clouds the issue by complaining of something trivial. The best method of obtaining a complete history with the least loss of time and without embarrassment to the patient, is to have a definite schedule in mind. One can thereby obtain coherently all the information necessary, and avoid falling into the common habit of “getting a hunch” as to the diagnosis early in the interview and attempting to elicit data confirming that opinion. The following history form is an example:

1. Family history — with a view to familial tendencies, not overlooking

blood dyscrasias, which may be a factor in the patient's menorrhagia and in the surgical risk.

2. Past history:

- (1) Menstruation — onset — periodicity — duration — amount of flow (in number of pads used daily).

Having made a brief record of this, we can compare it later with the patient's present menstrual cycle. Sometimes in this first note, observing that puberty was unduly early or late, or that the menses were profuse or scanty, we are put on guard for the presence of an endocrine disturbance, which is still the factor underlying the patient's symptoms.

- (2) Obstetrical history: Is the patient married—how long—how many times—is she living with her husband? How many full-term pregnancies — nature of deliveries — and puerperia — length of time in bed — presence of fever — persistence of the lochia.

Abortions — number — dates — nature — and recoveries.

A safe question is: “Does your trouble date back to a delivery or a miscarriage?” Infection plays an important role in gynaecology — and many cases with vague symptoms and indefinite findings are due to the residue of a previous post-partum or post-abortion infection.

- (3) Previous illness: Has the patient had scarlet fever, diphtheria, rheumatism, tonsilitis — tuberculosis — pleurisy — mumps? Certain of these may have rendered her a poor surgical risk, others may have caused an oophoritis, or vulvovaginitis; mumps may have been a factor in her present sterility.

- (4) Previous operation — what was done — for what symptoms—nature of recovery—and freedom from symptoms. Very often the patient's complaints are the same now as those necessitating an operation years before. Frequently an alleged appendicitis was a salpingitis. If the patient is not sure of the details it is worth while writing to the surgeon or hospital for information.
- (5) Venereal disease — suggested or excluded by the symptoms. We sometimes obtain a clue as to the starting point of an existing salpingitis, and our policy is affected by its duration.

Functional Inquiry.

Now we come to the present symptoms and functional enquiry — concentrating on each item, oblivious of other considerations.

1. What is the present menstrual cycle periodicity, duration and number of pads used daily; date of last period. Women often state that the periods are normal, but on closer enquiry an irregularity is detected. If amenorrhoea, menorrhagia or metrorrhagia are present, the transition from normal to abnormal should be described.

2. Pain is studied under the following headings:

- (a) Location: having the patient identify the area with her finger.
- (b) Duration.
- (i) Onset — sudden or gradual; accompanied by mild or severe shock.
- (ii) Constancy — does the pain persist, or is it intermittent, and at what intervals.
- (c) Radiation.
- (d) Character—Is the pain dull, sharp or colicky? Does it force the patient to bed, or keep her

awake nights? Does it prevent her carrying out her duties?

(e) Association: Is the pain associated with

- (i) Menstruation. Is it premenstrual and relieved by the onset of bleeding, or does it persist throughout the period.
- (ii) Defaecation.
- (iii) Micturition.
- (iv) Intercourse.
- (v) Exertion or prolonged standing.

Backache should be studied in the same order as pain.

3. Discharge—

Onset: gradual or sudden (suggesting a specific infection). Is it bloodstained, mucopurulent, seropurulent, watery, or foul smelling?

3. Tumors — swellings — calling the patient's attention to enlargements — glandular — hernial — abdominal — vaginal protrusion — or varicose veins.

5. Urinary symptoms — frequency — urgency — dysuria — haematuria— incontinence.

6. Fevers, chills, or sweats. This question may recall to the patient's mind previous bouts of fever, or an evening rise of temperature during her present illness.

7. Gastro-intestinal system:

How is the patient's appetite? Is there any intestinal distress or pain or vomiting, is she constipated, are laxatives used; how often?

A patient often deceives you unconsciously regarding constipation, and it may be an important factor in her condition.

8. Nervous system. Any headaches — insomnia — vasomotor disturbances of the menopause. Does the patient worry? This is an important question, as not infrequently we discover a slight pathological condition, and overlook a severe neurosis due to worry about

family or economic affairs. Women have an inherent dread of cancer, and often assurance to the contrary is the necessary treatment.

10. Patient's general condition. Is there any loss of weight or strength? Is she able to work and look after her home and family? This question may be the deciding factor as to the necessity of an operation.

Physical Examination.

The physical examination should include every system, the pelvis being studied last. Diseased tonsils may supply the focus of infection for an arthritic type of backache; cystitis may be caused by an apical abscess in a tooth.

The chest is examined and the breasts palpated (secretion in the breasts may be useful information), the kidneys are palpated, and the abdomen studied according to the best surgical technique.

Although a direct vaginal examination may not always be necessary, still it often repays one for the extra trouble to inspect a patient with a good light in the lithotomy position. Inspection reveals abnormalities of the vaginal and rectal regions — pruritus, leukoplakia — anal fissures, haemorrhoids — infected Bartholin glands — pus in the urethra — lacerations of the pelvic floor — cystocoele — rectocoele and incontinence of urine if the patient is asked to cough. The vaginal walls may betray the engorgement of an early pregnancy or the congestion of a vaginitis.

The cervix is studied systematically with the following points in mind:

- (1) Size. Is it pin point — normal or hypertrophied — keeping in mind the parity of the patient.
- (2) Shape. Is it lacerated — is it irregular or nodular in outline?
- (3) Position. Does it point anteriorly or posteriorly?
- (4) Consistency. Has it the velvety softening of an early pregnancy or

the stoney hardness of an infiltrative type of carcinoma?

- (5) Mobility. Is it mobile or fixed in parametrial exudate? Does it descend when the patient is asked to bear down?

The body of the uterus is then examined in the same manner, concentrating on each point in turn. It is often difficult to recall whether the uterus was normal for a woman of a certain development and parity, whether it was hard or soft, mobile or immobile, tender on moving, regular in outline, or related to adjacent tumors.

Masses in the fornices and cul-de-sac are similarly studied, noting especially consistency — relation to uterus — and if tender, the exquisiteness of the tenderness.

Speculum examination reveals polyp — cervical discharge — nabothian follicles — ulcerative or proliferative processes. If an erosion bleeds easily on the application of a ball wipe, the possibility of early malignancy should be considered and a section taken for biopsy.

The patient's bladder should always be emptied before a bi-manual examination is done. A urinalysis at this stage might be helpful or perhaps necessary; also a white blood count, and sedimentation time.

Discussion of Symptoms.

We are now in a position to study the evidence we have at hand — the past history of the patient supplies a background into which fit the signs, symptoms and other data upon which a definite diagnosis is made. Arranging the evidence reminds one of a popular toy of childhood days — the animal cut-out. The many pieces fitted properly combine to complete the picture of a certain animal.

Considering the menstrual symptoms, let us think of the possibilities suggested by each — checked by matching it with the signs present.

If *amenorrhoea* exists — from our knowledge of the other systems we can deny the existence of tuberculosis, anaemia—diabetes, emotional disturbances, or ovarian dysfunction. In admitting a diagnosis of early pregnancy, the picture should be — sudden cessation of menses — tingling in the breasts — with secretion in a nulliparous woman as early as four weeks — velvety softening of the cervix, and discernible enlargement of the uterus at six weeks.

Considering *irregular*. bleeding — menorrhagia or metrorrhagia, we think of the possibilities first in a young patient — and then of a woman approaching middle life. In the first group this symptom suggests:

- (1) Abortion — incomplete or threatened.
- (2) Salpingitis — bleeding may be menorrhagic or metrorrhagic — depending on the acuteness of the inflammation.
- (3) Ectopic pregnancy — more frequently of the tubal abortion type.
- (4) Endocrine disturbances — due to hyperfunction of the ovaries in an adolescent patient.

In a woman about forty years of age we look for:

- (1) Malignancy of the cervix uteri.
- (2) Malignancy of the corpus uteri.
- (3) Fibroids.
- (4) Fibrosis uteri.
- (5) Hyperplasia of the endometrium.
- (6) Cervical polyp.

Disease is no respecter of age — and this arrangement is subject to variation. Malignancy occurs in young women, as pregnancy and infection may be found in older ones. In the latter group, if pregnancy or inflammatory disease can be excluded, the patient is entitled to an examination under anaesthetic with a dilatation and curettage.

In women about the menopause this is imperative — we are all aware of the tragedies due to ignoring irregular bleeding, and discovering too late that malignancy exists.

Pain in the lower abdomen — depending on the type — suggests a similar range of conditions.

Colicky pain brings to mind — threatened abortion — ureteral calculus — and gastro-intestinal colic.

Sharp pain may be infective in origin or traumatic. If inflammatory, the appendix, fallopian tubes, ovaries, pelvic peritoneum, uterus, parametrial tissue or bladder may be involved.

Degeneration or infection in a pre-existing tumor is not common, but must be considered.

Pain may be traumatic due to a ruptured ectopic pregnancy, tubal abortion or the torsion of a pedunculated tumour.

Dull pain is usually congestive in origin, due to interference with the venous circulation, as the result of a chronic pelvic inflammatory disease, salpingitis or cellulitis, with or without retroversion. Large tumors may be present in the pelvis causing no pain but a dragging sense of fulness or weight.

The onset of a pain is suggestive — a sudden onset suggesting appendicitis or if accompanied by mild, moderate or severe shock, ectopic gestation. A persistent pain is usually inflammatory, an intermittent pain traumatic.

If a pain is associated with menstruation — distinction is made between an essential dysmenorrhoea existing since puberty and an acquired dysmenorrhoea — or congestive origin. Pain at defaecation may be the result of a rectal condition — haemorrhoids or anal fissures. Inflammatory masses in the cul-de-sac may be the cause, and exquisite pain is often present with an haematocoele accompanying tubal abortion.

Pain with micturition suggests a urethritis, cystitis, or vesical calculus.

Pain at intercourse may be the result of a vaginismus or salpingitis —

depending on its location — perineal or pelvic.

Pain on exertion or prolonged standing may be of chronic inflammatory origin or the result of mechanical disturbances, early prolapse of the uterus, retroversion or perineal lacerations.

A type of pain not easily diagnosed is that due to varicocoele of the pampiniform plexus. The patient complains of a dull ache, more or less continuous, aggravated by overwork and prolonged standing, and relieved by rest. It is more marked before menstruation and is relieved by the menstrual flow. The typical history, the absence of a tangible cause, the presence of varicosities of the legs or vulva, may suggest the proper diagnosis. Sometimes an indefinite sense of resistance is felt on either side of the uterus — especially if the patient is examined in the erect position. Impaction of an ovary beneath the pelvic brim, or an ovary prolapsed into the pouch of Douglas produces a dull heavy ache, often accompanied by nausea.

Backache is probably the commonest complaint of woman, and although often an orthopedic rather than a gynaecological condition, it merits consideration at this time suggesting one of the following conditions:

- (1) Acquired retroversion of an oversized uterus, pressing on the sacral plexus. This type is usually relieved by replacement of the uterus and the insertion of a Smith Hodge pessary.
- (2) Reflex pain from chronic pelvic inflammatory disease with or without retroversion.
- (3) Incarceration of a pelvic tumor beneath the promontory of the sacrum.
- (4) Arthritis of the sacro-iliac joint. This is diagnosed by a rheumatic history, discovery of foci of infection in the teeth, tonsils, or sinuses, and tenderness over the sacro iliac joint.
- (5) Relaxation or subluxation of

the sacro-iliac joint. There may be a difference in level, or prominence of the posterior superior spines sometimes corrected by over-flexion or over-distension of the thigh, and by supporting the joint with adhesive strapping or a suitable corset.

- (6) Lumbar backache caused by strain on the lumbar muscles due to faulty posture of the body, efforts at maintaining balance during the latter weeks of pregnancy, relaxation of abdominal wall and pelvic floor, allowing visceroptosis. Flat feet are often the factor in lumbar backache, as is the wearing of high-heeled shoes.

Further Examination.

Following the above-mentioned study of the patient, other diagnostic methods may be found necessary, namely:—

- (1) Sedimentation time of the red blood corpuscles which is helpful in identifying pregnancy, and pelvic inflammatory disease. It is most useful in deciding the rate at which a subacute salpingitis is subsiding.
- (2) Leucocyte count to aid in differentiating salpingitis, appendicitis and ectopic pregnancy.
- (3) Gas Insufflation to determine the patency of the Fallopian tubes. This is one of the first steps in the study of sterility, and useful in diagnosing the presence or absence of tubal disease in vague pelvic conditions.
- (4) Cystoscopic examination in urological conditions.
- (5) Barium enema and x-ray to exclude pathological conditions of the sigmoid and rectum.
- (6) Dilatation and curettage, indicated in irregular bleeding about the menopause. Absence of curettings, with a gritty feel to the curette suggests fibrosis ute-

ri:—hyperplasia of the endometrium or carcinoma of the body being decided on the gross and microscopic appearance of the material obtained.

(7) Observation.

The course of a disease is often a useful guide to the diagnosis. This applies in the persistence of signs and symptoms in tubal abortion and the response to rest seen in salpingitis.

Conclusion.

In conclusion, I wish to emphasize the necessity of collecting all the available information about a patient, and keeping an open mind as to the diagnosis till the evidence can be reviewed in its entirety. When the picture of a certain condition presents itself, a system should be used of cross-matching signs against symptoms, asking yourself such questions as: "Does this diagnosis sufficiently explain all the signs and symptoms present?" "Have we overlooked any other factors?" "Is not this exquisite tender-

ness out of proportion to a salpingitis?" "Would not a salpingitis acute enough to produce such tenderness be accompanied by a greater rise in temperature?" "Does this retroversion or laceration account for the patient's weakness, lassitude or loss of weight?" We must always keep in mind the important role infection plays in gynaecology. It may simulate many other pelvic conditions and it very often complicates them. Except in the case of pelvic abscess, it is a self-limiting disease — and about twenty-five per cent. of cases only demand surgical treatment. This may be months or years after the original infection, and then it is for the sequelae of the inflammation we operate, as we clear the clinkers out of a furnace when the fire has subsided.

In a court of law, a defense and prosecuting attorney elicit all the information. It is reviewed by the judge before passing sentence. A doctor combines judge and counsel in one, and may inflict great suffering or death on a patient by an impulsive decision.



Poliomyelitis.

By J. C. THOMAS, M.A., 3T2.

In this paper it is proposed to deal briefly with the diagnosis, prognosis, and treatment of poliomyelitis.

Classification.

Various classifications of the types of poliomyelitis are possible. Almost all the existing ones are based upon the situation of the lesions in the central nervous system, which are localized by the resulting paresis or paralysis of muscles. All recent epidemics have shown many cases definitely diagnosed by spinal puncture as poliomyelitis, but no paralysis appeared. Their exact number varies, but most observers agree that they represent at least 60% of the total incidence of the disease. It has been noted, also, that non-paralyzed cases in a given epidemic presented the same particular set of general symptoms which had preceded the advent of muscle weakness in the paralyzed cases. Obviously, then, we are dealing with a disease which has two phases: one of general systemic nature, and another in the form of central nervous system disorder.

Accordingly, Draper divided his cases into three distinct groups. In the first two groups there developed a picture of general systemic infection from which the child appears to recover completely, or in part, then to receive a second blow directly upon the cerebrospinal axis. In the first series, called the "dromedary" group, there are two distinct periods of illness with an interval of well-being in between. In the second series, called the "straggling" group, this period of comparative well-being is not present, but there is a sustained course of indisposition of varying intensity. In the third, or sudden onset group, all the signs point from the start to meningeal and nervous tissue involvement. In many cases which at first appear to belong

to the third group, the spectacular and violent picture dominates, and drives the memory of the slight preceding illness from the mother's mind.

Clinical Signs and Symptoms.

A typical attack of poliomyelitis presents a fairly characteristic picture. An early diagnosis in the pre-paralytic stage is essential in serum therapy. The classic description of the disease in this stage is that of Aycock and Luther. Their clinical summary, which is quoted now, has been used during the course of several epidemics for publicity purposes among the members of the profession.

The child seems prostrated to a greater degree than the temperature, which is usually under 102°F., would indicate. The face is flushed; the expression is anxious, and there is frequently pallor about the nose and mouth. The throat is slightly infected, but not enough in itself to account for the child's condition. The pulse is usually rapid, out of proportion to the temperature. The rest of the physical examination is negative, except for the portion which deals with the nervous system. Vomiting may occur, usually only once, and then shortly after the onset. The child may complain of frontal headache, sore neck or lumbar pain. The perspirations are at times increased in rate. There is distinct rigidity of the neck. However, this is not as marked as seen in meningitis. The head can be brought about half-way forward, when resistance is encountered, and the child usually complains of pain. The more constant and characteristic sign is stiffness of the spine. This is best brought out by having the patient sit up in bed and try to bend the head down on the knees. If the patient bends forward at all it is from the hips, and the spine is held rigid. The deep reflexes are

disturbed in some way in nearly every positive case, but they are usually hyperactive at this stage rather than diminished, as they are later.

Analysis of the figures from recent epidemics shows the five most common signs and symptoms with their frequency expressed as % of cases, are:

Fever	88%
Frontal headache	73%
Rigidity of neck	67%
Pain in back	48%
Vomiting	46%

After eliminating all doubtful cases.

Any variation or slight abnormality of the reflexes during the early stage of an acute febrile illness, combined with a stiff neck or spine, justifies a probable diagnosis of poliomyelitis and calls for the final step in the diagnosis.

This step is the examination of the spinal fluid, which is as important in the diagnosis of polio as urinalysis is in suspected diabetes.

The spinal fluid is clear, colourless and watery. It may have a slight opalescence when the number of cells is great. There is moderate increase in pressure. Microscopic examination shows an increase in the number of cells. Various figures are given up to 2,500 per c. mm., but an average is 20 to 50. In the very early stages they are chiefly polymorphs and some lymphocytes, but in the later stages lymphocytes predominate. The globulin content rises. The chlorides are normal, whereas they are decreased in tuberculous meningitis. The culture is sterile. It should be pointed out here that the spinal fluid, taken during the first hump of the dromedary type or the early part of the straggling type, may show no cellular increase and little or no globulin. The pressure may be slightly increased. A second puncture 12-18 hours later will show a decrease in pressure with a marked increase in cells. After the first two weeks the cell count drops to normal. A slight increase in globulin may persist for seven weeks or longer.

To sum up, the signs and symptoms which suggest poliomyelitis are fever, headache, neck stiffness, nausea and vomiting, lumbar or back pain, and spinal fluid changes. A sudden onset of these symptoms during the months of July, August and September, in a child or young adult, especially during an epidemic, would justify the positive diagnosis of poliomyelitis, even without paralysis.

Where paralysis ensues, its onset is sudden. The pre-paralytic stage may last 3-4 days. The paralysis in most cases is of the lower motor neurone type with flaccid muscles. Occasionally, in the cerebral type, there is spasticity. A characteristic is the unsystematic distribution.

Differential Diagnosis.

Mention only can be made of the conditions which have been confused with poliomyelitis. These are rheumatic fever and other forms of arthritis; upper respiratory infections, tonsillitis, and pneumonia producing meningismus; tuberculous, syphilitic, pneumococcic and septic meningitis. Encephalitis is the most difficult to diagnose. The cell count, globulin and sugar content of the c.s.f. are frequently alike. Encephalitis cases are continuously drowsy and stuporous, and fail to respond as children with polio do.

Prognosis.

The problem of prognosis in acute poliomyelitis involves several considerations. (1) What is the mortality? (2) Will paralysis appear? (3) Will an initial paralysis advance? (4) Will paralysis be permanent?

(1) The epidemiological report of the League of Nations Health Section, published in March, 1930, gives the average death-rate from all forms as 12 to 13%. If, however, we exclude the non-paralytic forms and consider only the forms that are accompanied by paralysis, the case mortality may reach 25% or more. The prognosis is worse in adolescents and adults than

in children. (2) There seems to be no relationship between the severity of symptoms in the early stage and the onset of paralysis. Draper believes that cases with spinal fluid cell counts less than 100 per c. mm. during the first 12-18 hours rarely develops muscular weakness. (3) There are no signs which indicate that existing paralysis will advance. Usually, if no additional muscle weakness appears within 6-12 hours of the first paralysis, there is small chance of any further involvement. (4) This question cannot be answered under two years from onset. Studies of epidemics have shown spontaneous improvement, which begins almost at once in most cases and continues for two years or more. Collected statistics show that about 50 per cent. of cases suffer from sequelae which handicap them for life. Improved methods of treatment have made a marked reduction in the number of cases with residual paralysis. In the Manitoba epidemic, 1928, the number of cases with residual paralysis in the group of 74 cases serum-treated before paralysis was 4, or 5%, while in 54 cases with no serum, 34 cases, or 53%, showed residual paralysis. Serum was given to 33 cases after the advent of paralysis; 15, or 45%, showed residual paralysis.

Treatment.

Inasmuch as it has been shown that poliomyelitis is an acute infectious disease possibly transmitted by healthy carriers, strict isolation of patients should be maintained. Nurses and physicians in attendance should take especial precautions on leaving a patient lest they become carriers. Although the incubation period has not been accurately determined, there is good evidence to show that 10-14 days is an average length of time. Therefore, contacts with proven cases should be isolated for observation for at least 14 days. Concurrent and terminal disinfection should be carried out as in any contagious disease.

The general treatment of the acute stage of the disease should be carried out exactly as in other infections. Certain points in the treatment of poliomyelitis are of such tremendous importance that they will be referred to. In so doing the plan advocated by Jones and Lovett will be followed.

Stage 1—from onset to the disappearance of muscle tenderness—6 to 8 weeks or longer:—

- (1) Rest, general and local.
- (2) Avoid meddling therapeutics, as massage, electricity, exercise.
- (3) Prevention of deformities by splinting in the position of muscle equalization.

Remember, it is not physiological to irritate and stimulate the peripheral ends of nerve centres while the acute process exists.

Stage II.—Convalescent period, when tenderness has disappeared until two years or more.

Avoid especially: (1) Stretching of weak muscles or groups of muscles. (2) Fatigue of muscles by over-exercise, over-use, or over-massage. (3) Development of deformities by efficient splints and correct positions. (4) Disregard of muscle balance.

Before deciding whether or not a patient should be allowed to walk, it should be considered that Lovett showed that walking to any extent in the first year is apparently attended with risk, because it is accompanied by a change from partial to total paralysis in many instances in the muscles of the lower extremities, whereas in other parts of the body this does not occur.

On general principles then unrestricted walking is only to be allowed when complete recovery has occurred or when there is reason to believe that the hope of complete recovery or further improvement must be abandoned.

Stage III.—The chronic stage has been put at two years after the onset, and represents the cessation of maxi-

mum improvement and the period of residual deformities. Treatment during this stage is dependent on one factor, that is, the best method of improving the function of the body. It is necessary to determine whether the patient must live supported by apparatus, or whether surgery can relieve some or all of the difficulties. Surgery is applied to relieve deformities, improve function and secure stability. Space will not permit the detailed discussion of the various means by which orthopaedists accomplish these aims.

Specific Treatment.

Since neither the pathogenic agent of the disease nor its mode of propagation, nor its point of entry are known absolutely for certain, and since these three points, which are essential for the development of a rational method of treatment, are still the subject of lively controversy, the specific treatment of poliomyelitis and its prophylaxis cannot be said to have made any great advance during recent years.

The discovery almost simultaneously, by Flexner and Lewis and Landsteiner and Levadite, in 1909, of the filtrable nature of the virus causing the disease, was quickly followed by Flexner and Lewis's observations that recovery from an attack of experimental polio afforded protection from a second inoculation. This in turn was followed by the detection of immunity or neutralizing substances in the blood

serum, first of recovered monkeys, and then of recovered human beings, in 1910. Since recovery from an attack of polio was obviously brought about by a process of immunization, similar to that in other infectious diseases, Flexner and Lewis endeavoured to prevent the development of the infection in inoculated monkeys by the administration of blood serum taken (1) from recovered monkeys; (2) from recovered human beings. The results, while not constant, were convincing.

These experimental results were at once utilized as a basis of serum therapy in man by Netter in 1910. By 1916 Netter and his associates had reported a total of 34 cases of acute poliomyelitis which they had treated by the intrathecal method of injecting convalescent serum. This method has since been used with good results by other authors in all parts of the world. That the results of serum therapy are hopeful is the opinion of most observers, but it is a difficult question to decide.

Briefly stated, it has been shown by monkey experiments that convalescent serum is virucidal; that is, it protects monkeys from intrathecal inoculation of virus when mixed with the virus before injection; it also protects when given intrathecally or intravenously.

In 1917 an anti-poliomyelitis serum was prepared by Petti. This serum was obtained by immunizing horses with the spinal cords of monkeys which had died of poliomyelitis. Further ex-

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periments on the immunization of the horse with the virus of polio were carried out by Fairbrother in 1930. The horse serum obtained by this process possessed the quality of neutralizing the poliomyelitis virus, but the monkeys nevertheless contracted the disease when a sufficiently active virus was injected intrathecally. It does not seem possible, therefore, to recommend the use of this serum at present.

Certain authors, notably Rosinow, having found in the pharynx of polio patients a special strain of streptococcus, used a serum prepared from this streptococcus. This serum is open to the same objection as the others.

How can we explain the favorable results with normal horse serum or normal human serum? Since there is a rapid transfer of horse serum to the general circulation when injected, the possibility of a favourable non-specific protein effect would seem to require consideration. As to normal human serum, Aycock and Kagan conclude that the neutralizing effect which has actually been observed is evidence of acquired immunity and not a property of normal serum.

Several factors come into play when comparing reports of various forms of serum therapy with the purpose of estimating their usefulness. Some of these can only be mentioned here.

The authenticity of cases which depends on the accuracy of diagnosis is the most fundamental one. The vagaries of epidemic disease in the rise and fall of so-called virulence, thus causing a variation in the case fatality rate from time to time, are not less noticeable with polio than with other diseases. This introduces a factor that cannot be reckoned with by any method short of a cold-blooded alternation

of cases — one treated and the other untreated. A physician dealing with the lives of children rather than guinea-pigs naturally shrinks from such a procedure if he has any confidence at all in serum therapy.

However, a careful study of the reports of the Manitoba epidemic of 1928 and the Ottawa epidemic of 1929, where convalescent serum was used as extensively as the supply would permit, leaves the impression that this form of therapy is of value when administered in the pre-paralytic stage. From the reports, the intramuscular route seems to be sufficiently efficacious to justify its preference, as well as its being simpler and safer. The best results were obtained with serum given in the first 48 hours. Likewise, if the figures quoted above are recalled, it will be remembered that little result is obtained from serum administered after the onset of paralysis.

Summary.

1. A clinical classification of cases of poliomyelitis has been given.
2. The signs and symptoms by which poliomyelitis may be diagnosed have been outlined.
3. A few of the common conditions which may be confused with polio have been mentioned.
4. Prognosis has been discussed under four possible headings.
5. The general treatment of poliomyelitis has been discussed for all stages of the disease.
6. Various types of specific serum therapy are described, and some of the difficulties in evaluating their results in epidemics are mentioned.

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